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Omar Martin Fieles-Ahmad/Selina Schulze Spuentrup

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O. M. Fieles-Ahmad, S. Schulze Spuent
Otto-von-Guericke-Universität Magdeburg
Fakultät für Wirtschaftswissenschaft
Postfach 4120
39016 Magdeburg
Germany

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Prompted Choice and Organ Donor Registrations: Quasi-Experimental Evidence from Italy*

Omar Martin Fieles-Ahmad[†], Selina Schulze Spuentrup[‡]

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Abstract

We examine the effects of introducing prompted choice on organ donation behavior. Applying a generalized difference-in-differences design, we take advantage of the gradual roll-out of a policy in Italy that integrated the question of organ donation preference into the process of identity card renewal. Our findings show that municipalities prompting the question saw a significant increase in consent registrations, although individuals retained the option to abstain from making a choice. We also provide novel evidence that regions with higher levels of registered consent have higher cadaveric organ donation rates.

Keywords: organ donation, organ donor registry, prompted choice, health policy

JEL: I18, D70

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[†] Otto-von-Guericke-University Magdeburg; Email: omar.fieles-ahmad@ovgu.de.

[‡] ifo Institute Dresden and TUD Dresden University of Technology; E-mail: schulze-spuentrup@ifo.de (corresponding author).

1 Introduction

1.1 Motivation

Organ shortage remains a pressing issue worldwide, resulting in long waiting times for organ transplants in many countries. Policymakers continue to seek effective strategies to increase donation rates, aiming to narrow the gap between organ supply and demand. The number of patients on transplant waiting lists worldwide consistently far exceeds the number of transplantations performed (EDQM, 2004-2024).[1] This disparity has increased over time, as the number of patients on waiting lists has risen more sharply than the number of donors and the number of transplants. An untapped potential is the substantial gap between intention and actual behavior. While large majorities express support for organ donation, only a fraction formally records their choice. Cross-country surveys confirm that this gap is widespread. Around 80–90% of adults state support for organ donation, but only one third to one half document a decision.[2] Moreover, among individuals who intend to register as donors, only about half ultimately follow through (Yang and Sheeran, 2024). These findings indicate that one of the main barriers to expanding the donor pool is not merely opposition to organ donation, but rather administrative hurdles, procrastination, emotional hesitation, or low salience.

The persistence of this gap between intention and actual organ donation behavior is central to the ongoing academic and public debates concerning the design of consent systems, particularly the choice between an opt-in (explicit consent) or an opt-out (presumed consent) framework (e.g., Hallam and Prange, 2020; Hyde et al., 2021; Tennankore et al., 2021; Jensen and Larsen, 2020; Gundle, 2005). Where opt-out remains contentious or infeasible, the key policy challenge is to design mechanisms that preserve individual autonomy while reducing inertia and procedural barriers.

Italy provides a unique setting to study the effects of a prompted choice system, which was gradually introduced in 2012. During the renewal of identity cards, municipalities ask citizens to record their organ donation preferences. These stated preferences are directly

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[1] A waiting list reflects the stock of unmet demand, as it comprises all patients currently awaiting a transplant, including those newly listed in a given year and those who were listed in previous years, but have not yet received an organ. It may still understate total demand as some patients die or become too ill while waiting.

[2] See, for example, the U.S.(Department of Health and Human Services, Health Resources and Services Administration, 2019), Canada (The Kidney Foundation of Canada, 2025), Germany (Zimmering and Haack, 2025), Australia (Australian Government Department of Health, 2024).

transmitted to and stored in a centralized national registry. We use the staggered roll-out to examine whether prompted choice is a viable policy to increase organ donor registrations.

1.2 Background

Various studies find that opt-out systems are related to higher donation rates (e.g., Abadie and Gay, 2006; Shepherd et al., 2014; Schulze Spuentrup, 2025). However, the evidence is not entirely consistent as some studies report limited or no effects (e.g., Dallacker et al., 2024; Arshad et al., 2019). Additional ethical and political concerns have led several countries to refrain from adopting presumed consent policies despite ongoing pressure to act (e.g., Symons and Poulden, 2022; Hyde et al., 2021; Jensen and Larsen, 2020; Hallam and Prange, 2020),[3] whereas, in recent years, some countries have decided to switch from an opt-in to an opt-out policy (e.g., Schulze Spuentrup, 2025).

Unlike opt-in systems, which require individuals to provide explicit consent for organ donation, opt-out systems assume consent unless an objection has been made during one's lifetime. In soft opt-in and soft opt-out systems next-of-kin are still consulted and to some extent involved in the decision-making process (Delgado et al., 2019). The main difference between opt-in and opt-out systems lies in how they handle situations where a deceased person's wishes are unknown. The underlying issue is that many people either refrain from making a decision about organ donation or fail to document it officially, even though surveys consistently indicate widespread support for organ donation. In 2006, 56% of Europeans reported being willing to donate an organ after death, compared to 12% who actually had an organ donor card (Eurobarometer, 2007). The majority of people remain unregistered or do not even communicate their wishes to family members, partly because people often avoid confronting their own mortality. As a result, one of the main reasons why organ donations do not proceed is the absence of documented consent (e.g., Deutsche Stiftung Organtransplantation, 2025; Centro Nazionale Trapianti, 2020).

One promising solution is a prompted choice framework that requires individuals to be explicitly asked to express a preference, but they are not obliged to do so. In contrast to mandated choice, where a decision is compulsory, prompted choice allows for a conscious decision to abstain. However, as prompted choice does not specify how to handle non-responses, the opt-in or opt-out rule ultimately determines the default for those who abstain.

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[3] Critics argue presumed consent may undermine personal autonomy and trust in the transplant system, and cannot rule out that individuals may become donors unintentionally, particularly if vulnerable groups are not fully informed.

Registration of organ donation preferences may influence actual organ donation outcomes through multiple pathways. Higher registration rates reduce the need for next-of-kin to make donation decisions on behalf of the deceased, which in turn will lead to fewer family refusals. Official registration also serves as a strong signal of intent (Byrne and Thompson, 2001; Abadie and Gay, 2006), thereby discouraging family members from vetoes. Unlike in first-person consent systems, where a previous choice made by the deceased is binding, some consent frameworks allow families to overrule a documented preference. When the population is prompted to record their wishes during their lifetime, this can foster family discussions, thereby reducing uncertainty when willingness to donate is assessed at the time of death. A further mechanism relates to the interpretation of abstentions. Whereas a failure to register can reflect inattention or avoidance, it may also represent an informed decision to abstain after being prompted, for instance, when individuals prefer to leave the final decision to their family to ensure that all life-saving measures have been exhausted before organ donation is contemplated. In the U.S., for instance, about 20% fewer people indicate they would authorize the removal of a relative's organs if the deceased's wishes are unknown compared to when they are known (Department of Health and Human Services, Health Resources and Services Administration, 2019). A side effect of higher registration rates could be that the deceased's wishes are more likely to be followed. Higher registration rates may reduce uncertainty for medical organ procurement personnel.[4] Existing evidence suggests that organs are sometimes not procured, despite legal authorization, due to hesitation or ambiguity about the deceased's wishes (Gimbel et al., 2003; Matesanz and Dominguez-Gil, 2007).

Following Davidai et al. (2012), defaults affect the meaning people attach to the act of registering as an organ donor. A standardized process that ensures everyone faces the decision about organ donation at least once in their life may foster social norms that promote donation as a socially encouraged behavior. According to a survey-based study by van Dalen and Henkens (2014), both mandated choice and opt-out tend to be more effective in increasing donor registrations than opt-in. The literature has partly considered the mere existence of registries (e.g., Bilgel, 2012), but without examining prompted choice using administrative registration records.

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[4] Organ donation is highly time-sensitive. After brain death, organs remain viable only with continued ventilation and circulatory support, and generally need to be procured within hours to a few days to preserve organ quality (Eerola et al., 2022).

1.3 Research contribution

This paper provides nationwide quasi-experimental evidence on the effects of a large-scale prompted choice policy for organ donation. We use a novel panel dataset that accounts for the staggered introduction of local registries as well as annual entries, enabling us to examine both levels and changes over time. In this regard, this study is the first to systematically compare regional registered consent rates with actual organ donation rates and to link their dynamics, as suggested by Christen et al. (2018). Our analysis extends the literature on opt-in and opt-out systems by demonstrating that this intermediate policy is both effective and politically feasible in contexts where opt-out remains controversial. By exploiting within-country variation in the roll-out of local registries, our design overcomes limitations of cross-country comparisons such as contextual and cultural differences.

We show that higher registry coverage substantially increases consent registrations. In turn, regions accumulating higher levels of consent exhibit higher organ donation rates from deceased donors. We further exploit an additional source of variation in exposure to prompted choice. A subsequent level shift in ID renewals associated with the introduction of the electronic identity card (eID) potentially increased the frequency of prompts. Building on this additional variation in exposure, we find even larger effects.

While the effect on organ donations is modest, this reflects the rarity of medically suitable donor deaths, with about 1% of deaths occurring under conditions compatible with organ retrieval (e.g., NHS Blood and Transplant, 2016; Organ and Tissue Authority - DonateLife, 2025; Canadian Blood Services, 2026). Our results nevertheless demonstrate that documented consent matters for realized donation and that prompted choice substantially increases the stock of such consents.

2 Institutional setting

Italy exemplifies the global patterns observed regarding organ donation. First, it faces a shortage of organs, as the number of patients transplanted each year falls short of even covering the newly listed patients on the waiting list. Figure 1 also illustrates that the number of patients on transplant waiting lists in Italy is persistently high.[5]

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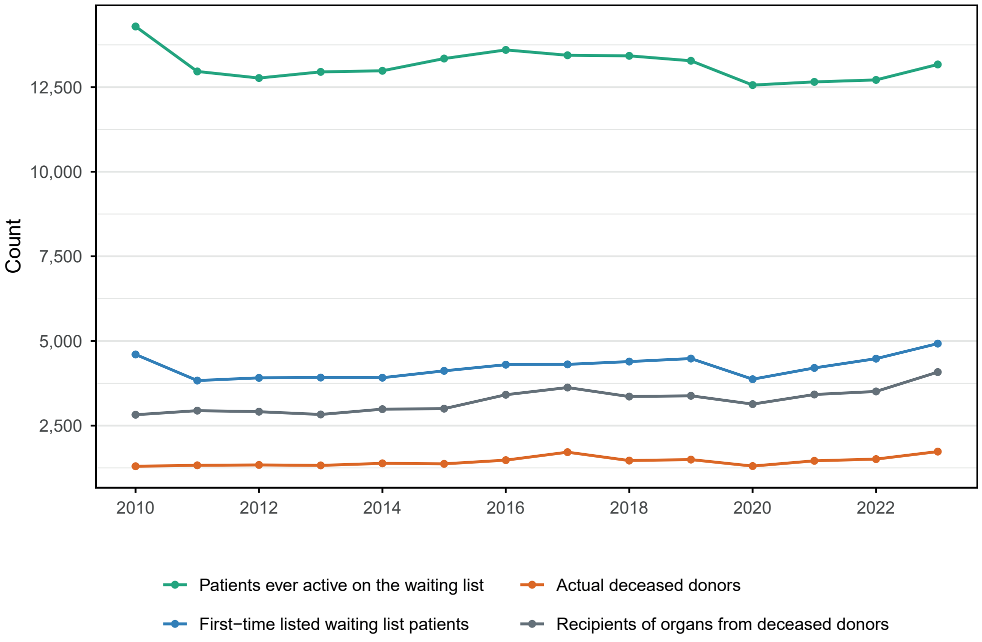
[5] The number of transplant recipients exceeds the number of deceased donors, as each donor typically donates multiple organs, averaging around two to three per donor.

Figure 1: Organ donation and transplantation trends in Italy



Notes: Patients ever active on the waiting list include all individuals listed at any time during the year. First-time listings are patients newly added to the waiting list throughout the year. Actual donors refer to the total number of deceased persons from whom at least one organ was recovered for transplantation. Recipients denote all patients who received an organ from a deceased donor. Data are sourced from the Transplant Newsletters (EDQM, 2004-2024).

Second, despite consistently high public support (Tomaino et al., 2025), formal registrations remained extremely low throughout the 2000s, when registration relied on unprompted mechanisms. By 2010, most people in Italy had not recorded a preference. Approximately 116,400 declarations of intent had been recorded nationwide through *Local Health Authorities* ('Azienda Sanitaria Locale', ASL),[6] equivalent to less than 0.2% of the total population. According to the Eurobarometer (2007) survey, 13% of Italians stated having an organ donor card. However, the advantage of formal registration is that a person's decision is reliably available when needed, regardless of whether a donor card is permanently carried. With both formal registrations and donor card ownership remaining low, organ donation decisions were frequently left to the next-of-kin, often under distress, contributing to avoidable refusal rates for transplantable organs. On average, family refusal rates stood at around 30% (Newsletter Transplant, 2011).

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[6] 89% of which were positive and 11% negative.

As of today, individuals in Italy have several options for declaring their willingness to donate organs (Centro Nazionale Trapianti, 2025c). First, any signed statement, such as a donor card, is legally valid, although not recorded in the national registry, and therefore should allways be kept with the individual. Second, individuals can register their decision either with ASL by signing a dedicated form or through the *Italian Organ Donor Association* ('Associazione Italiana Donatori di Organi', AIDO) by submitting a legally valid handwritten statement. In both cases, the declaration is automatically recorded in the national *Transplant Information System* ('Sistema Informativo Trapianti', SIT). Finally, individuals can also state their preference when applying for or renewing their identity card at the municipal office, where the information is likewise transferred to the SIT.[7]

As of March 2025, the total number of declarations of intent exceeded 22 million (Sistema Informativo Trapianti, 2025). The vast majority (92.6%) were recorded through municipalities, less than 1% were registered via ASL, and 6.5% were submitted through AIDO.[8]

As depicted in Figure 2, the legal framework for organ donation in Italy is defined by Law No. 91/1999.[9] According to Article 5, local health authorities must inform citizens of their right to express a preference regarding organ donation. If individuals are prompted to state their choice but do not respond, they are presumed to be donors (opt-out applies). In contrast, those not being approached to declare their intent are not considered potential donors (opt-in applies).[10]

Taken together, the institutional framework generates four distinct groups of individuals. First, individuals who were formally asked and explicitly registered consent are considered potential organ donors. Second, individuals who were asked and explicitly registered an objection are considered non-donors. Third, individuals who were formally asked but abstained from recording a preference are presumed to be donors, although family members are still consulted. Fourth, individuals who were not yet formally asked to declare their preference are not considered donors under the law, even though relatives remain involved in the final decision.

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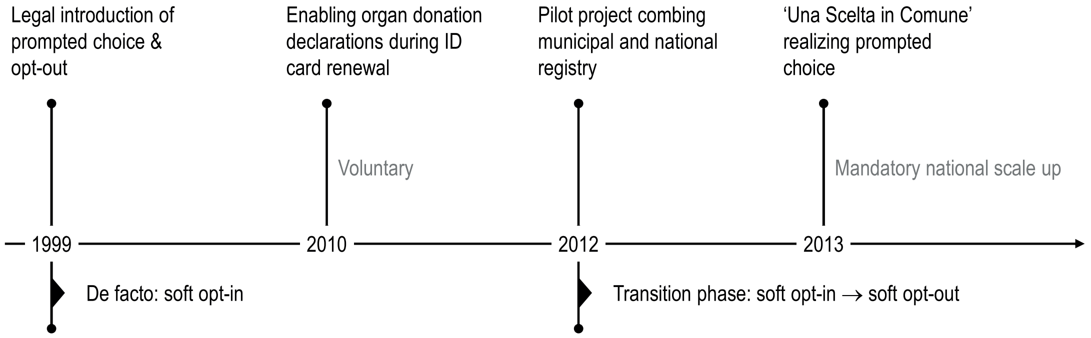
[7] One's choice is not visible on the identity card itself.

[8] Considering that the AIDO registration modality has existed since 1999, its share appears negligible compared to registrations made through municipality offices.

[9] The explanations of the institutional setting are mainly based on those by Christen et al. (2018).

[10] In the absence of an expressed preference, the final decision falls to the next-of-kin (soft opt-in/soft opt-out). If a valid declaration was available, however, the family was not entitled to override the deceased's will.

Figure 2: Law timeline



Notes: The figure presents the timing of law changes regarding organ donation in Italy.

Even though a national registry was set up in 1999, allowing individuals to record their consent or objection, the system lacked a mechanism to verify whether a person had been asked to state a preference. Consequently, the registry did not fulfill the legal precondition for operationalizing the prompted choice framework. While local hospitals had access to both affirmative and rejecting entries, the system functioned de facto as soft opt-in. This situation began to change in 2010 when Italian municipalities were legally authorized to ask citizens about their organ donation preferences during the renewal of their identity cards.[11] However, this legal provision had no immediate practical implications as municipal participation in the program ('Una scelta in Comune') was initially voluntary, and there was no technical integration between local and national registries. In 2012, the region of Umbria launched a pilot project to address these limitations. The municipalities of Perugia and Terni conducted an information campaign, trained civil officials, and developed software that enabled direct data transfer between municipal registries and the national organ donor registry. The initiative was scaled nationwide through a staggered roll-out, gradually linking municipalities to the national registry (see Figure 3). With this reform, Italy established a systematic mechanism to track individuals' donation preferences across the population and has thereby expanded the population formally exposed to prompted choice, shifting the legal default for newly approached individuals from opt-in to opt-out. The introduction of municipal registries effectively constitutes the implementation of a prompted choice framework. Throughout this paper, we refer to the introduction of registries as the concurrent implementation of prompted choice.

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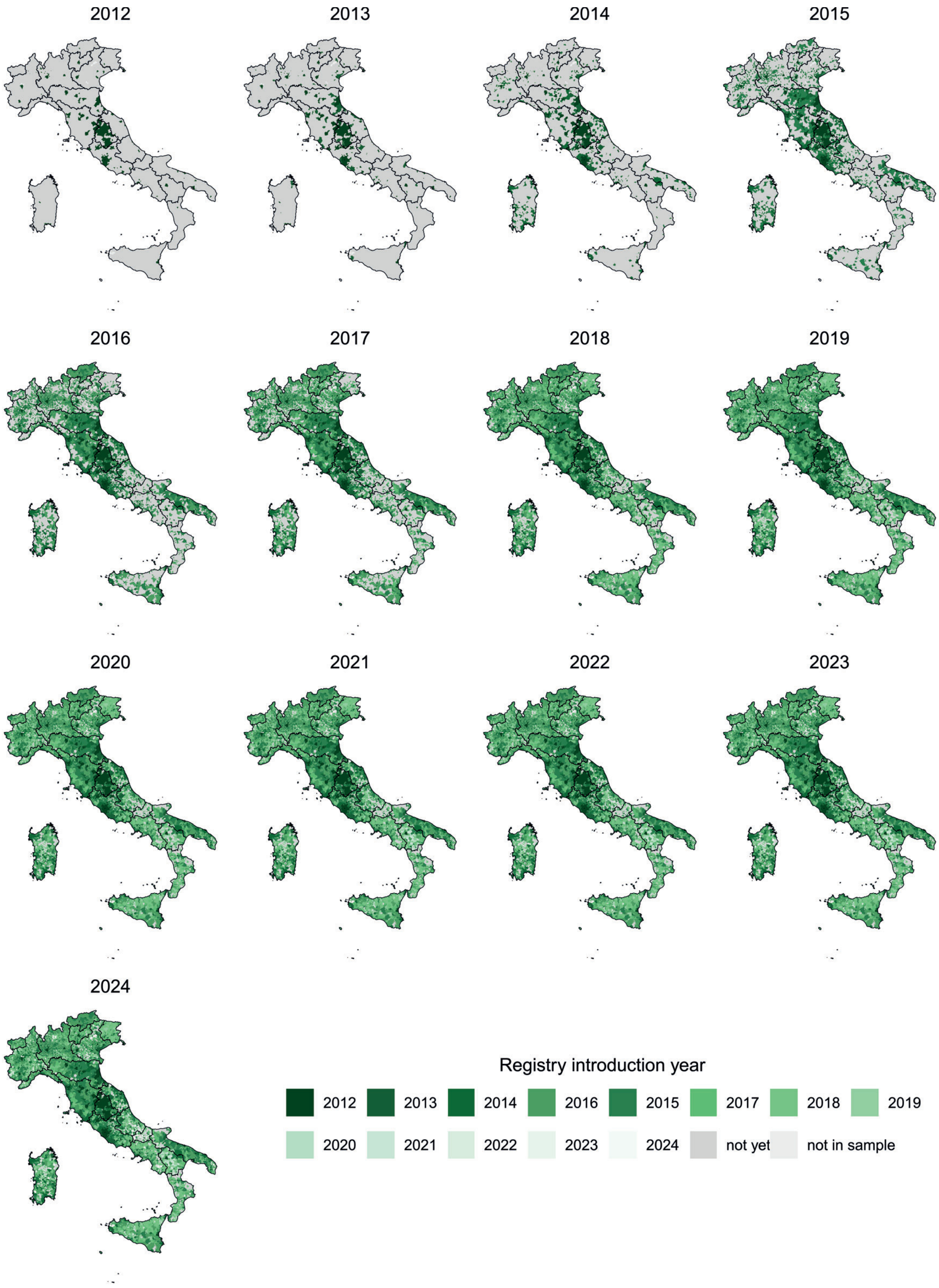
[11] ID cards in Italy are generally renewed every ten years, with the first issuance typically occurring at the age of 18. Exceptions apply in cases such as loss or theft.

Figure 3: Expansion of municipal registries 2012-2024



Notes: The figure depicts the implementation of municipal registries in Italy from 2012 to 2024. Municipalities shown in darker green are early adopters, those in lighter green introduced a registry in later years, and those in dark gray have not yet implemented a registry.

In Italy, the current procedure for determining an individual's donation status operates as follows: once a potential donor has been declared deceased, the transplant coordinator first checks whether a registered declaration of intent exists. If no such record is found, the coordinator then verifies three additional factors:

1. the individual's municipality of residence,
2. the date of the most recent identity card renewal, and
3. the software's activation date (if applicable) linking the municipal registry to the national database.

Only if all three factors confirm that the individual had been formally asked but chose to abstain from registering a preference is the person considered an organ donor under the law. Nevertheless, family members continue to be involved in the decision-making process.[12]

3 Empirical strategy

3.1 Data

We draw on annual data on documented organ donation decisions at the municipality level from 2012 to 2024, obtained from the SIT (Centro Nazionale Trapianti, 2025a).[13] These data refer to declarations of intent registered in the SIT, allowing us to observe both consents and objections. All citizens aged 18 and above have the opportunity to state their organ donation preferences. All declarations made to municipal offices participating in the 'Una scelta in Comune' project are recorded in the SIT and can be accessed in real time by medical personnel in the event of a potential donor in order to verify whether a decision was expressed during their lifetime.

In addition to consent registrations, we analyze data on deceased organ donors. We compute the donation rate as the number of utilized deceased donors per million population, using annual regional population counts as denominators. Throughout the paper, we refer to the actual donation rate for simplicity. The Italian data, however, capture utilized donors, that

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[12] In cases of clear opposition from relatives, organ retrieval does not proceed, despite the legal presumption of consent. Nevertheless, registering a donation decision can serve as a credible signal of the individual's preferences to next-of-kin, thereby helping to guide decision-making in emotionally charged situations.

[13] We have to disregard registrations through other channels due to very limited data availability, but we have good reason to believe that their numbers are small in any case (see Figure C.1 in the Appendix).

is, deceased persons from whom at least one organ was retrieved and transplanted. Organs are occasionally recovered but not transplanted, for example due to unexpected medical findings or organ quality concerns. Data on deceased organ donors are only available at the regional level, covering all 21 Italian regions, and also provided by the SIT (Centro Nazionale Trapianti, 2025b).

We consider several outcome measures. We distinguish between flow measures capturing contemporaneous registration activity and stock measures capturing the accumulated prevalence of registered consent, reflected in five distinct variables (see Section 3.3). Our primary interest lies in the share of the population that has registered their consent to organ donation, as we hypothesize that this measure is a key factor driving actual organ donation rates. To approximate this stock measure, we first aggregate new consent registrations over time, based on the assumption that individuals who registered in previous years remain registered in subsequent periods.

As we lack information on individuals who may have changed their decision, which is possible at any time, and on how such changes are reflected in the data, this approach entails a risk of wrong counting. To address this issue, we additionally construct a more conservative measure by subtracting all recorded objections from the number of consents in each year. In doing so, we assume that all observed objections represent the withdrawal of previous consents. While this is likely an overcorrection, it provides a lower-bound estimate, including only those consents we can reasonably assume have not been revoked. While panel data on abstentions are not available for our observation period, we present the composition of decision outcomes (consents, objections, and abstentions) separately using a cross-sectional snapshot for 2022 in Section 6.

The overall prevalence of consents is mechanically increasing over time, as we do not observe any removals from the municipal registry. We therefore also consider the annual number of new consent registrations per 100 inhabitants as a flow measure. Since individuals generally remain in the registry once they have recorded their decision, low numbers of new consents should be interpreted cautiously, as this could be merely due to an already high level of registrations. We regard this as a minor concern in the initial years of registry introduction, but it may become more relevant as consent rates increase over time. Accordingly, we also consider new registrations relative to the population that has not already registered a preference, thereby capturing registration flows among those remaining unregistered. We further complement population-based measures with the share of consents among all recorded decisions.

To account for a set of covariates, we rely on regional data from the Italian National Statistical Institute (ISTAT) covering demographic, health, and socioeconomic indicators. Addressing factors associated with registration behavior, we control for the population shares of individuals below 18 and those aged 65 and above to capture differences in age structure. In Italy, minors are not eligible to register their consent to organ donation, whereas older people may be less willing to do so. We further include the median household income, the share of households with internet access, and the share of individuals reporting good health as proxies for regional socioeconomic conditions, infrastructure, and health environments. Regarding determinants of actual organ donation rates, we focus on cause-specific mortality variables that shape the potential donor pool. These include deaths due to circulatory diseases and deaths from external causes of injury, which constitute the leading causes of death among organ donors, as well as COVID-19-related deaths. During the early stages of the pandemic, the use of organs from donors infected with COVID-19 was restricted, while the severe strain on intensive care units may have further affected regional organ procurement (Angelico et al., 2020). We report summary statistics for all outcome, explanatory, and control variables in Table 1.

Table 1: Descriptive statistics

	Obs.	Mean	SD	Min	Max
Coverage^{reg}	273	68.17	36.34	0.00	100.00
New consent rate^{a}	273	1.73	1.62	0.00	5.94
New consent rate^{b}	273	2.02	2.02	0.00	8.12
Consent share	267	76.88	13.31	34.19	100.00
Overall consent rate	273	6.82	8.01	0.00	31.90
Lower bound consent rate	273	3.96	4.97	0.00	23.78
Population share aged <18	273	15.84	1.47	12.66	19.82
Population share aged 65+	273	23.19	2.52	16.50	29.00
Household income	273	31 364.71	5077.28	21 009.00	42 793.00
Internet access	273	72.64	10.30	44.60	89.80
Good health	273	69.86	4.33	59.57	84.94
Organ donation rate	270	21.71	12.13	3.20	70.90
Deaths from circulatory diseases	273	3.90	0.59	2.66	5.51
Deaths from injury	273	0.44	0.07	0.26	0.61
Deaths from COVID-19	273	0.25	0.51	0.00	2.86

Notes: The table presents summary statistics of the main variables at the regional level for the observation period 2012-2024. Coverage^{reg}, new consent rate^{a}, lower bound consent rate, population under 18, population ages 65 and above, persons reporting good health are expressed as percentages of the total population. New consent rate^{b} is defined relative to the total population not already registered. Consent share refers to the percentage of total decisions made. Household income refers to median household income including imputed rents, and internet access indicates the share of households with internet access at home. The organ donation rate is measured per million population. Death rates are expressed per 1000 inhabitants.

3.2 Identification

During the registry roll-out period, there was considerable regional variation in both the timing and the intensity of the expansion. We measure the intensity of registry expansion by the proportion of municipalities within a region connected to the national registry and thus able to collect citizens' organ donation preferences. We exploit these variations across regions and over time to identify the impact of registry expansion on consent registration and organ donation rates.

We employ two-way fixed effects (TWFE) specifications, which can be interpreted as generalized difference-in-differences estimations. Identification relies on within-region variation over time stemming from quasi-experimental changes induced by the policy reform. Hence, our estimates capture the effects of local registry availability on organ donation outcomes.

The plausibility of our identification strategy rests on the assumption that the timing of registry expansion is largely exogenous to regional trends in organ donation behavior. While municipalities could have an interest in fostering the number of registered consents to organ donation, organs are allocated across regional and even national boundaries. Therefore, the benefits from potentially higher donation rates do not necessarily accrue directly to the adopting municipality.

First, we analyze whether regions with higher registry coverage experienced different changes in consent registration rates between 2012 and 2024. We then examine whether higher consent registration rates translate into higher organ donation rates. The identifying assumption is that in the absence of the registry expansion, regions with higher and lower exposure to the reform would have followed parallel trends in organ donation outcomes.

3.3 Method

This study aims to investigate whether a prompted choice policy can contribute to alleviating the organ shortage. As a first step, we examine whether introducing municipal organ donor registries including incorporating the question on organ donation preferences in the process of ID card renewal made a difference in consent registration rates in Italian regions.[14] We

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[14] We assign each introduction to the first full year after implementation, as not all data sources provide information on the exact month of adoption.

estimate a TWFE model of the following form:

$$Consent_{rt}^{(*)} = \delta Coverage_{rt}^{reg} + \theta' X_{rt} + Region_r + Year_t + \varepsilon_{rt}\,, \tag{1}$$

where $Consent_{rt}^{(*)}$ denotes the registration of consents to organ donation in region r in year $t = 2012, ..., 2024$. $Coverage_{rt}^{reg}$ is the registry coverage rate that measures the share of the population having access to the registry.[15] The coefficient δ refers to our variable of interest. X_{rt} is a vector of control variables that could have influenced the willingness to donate one's organs (see upper panel of Table 1). $Region_r$ and $Year_t$ are region and year fixed effects, respectively. ε_{rt} denotes the error term. Standard errors are clustered at the regional level. Given the low number of clusters (21), we also compute wild cluster bootstrap p-values.

As described in Section 3.1 and formally defined in Appendix B, we estimate several outcome measures $Consent_{rt}^{(*)}$:

1. New consent rate[a]: $Consent_{rt}^{(flow_1)}$ measures newly registered consents in region r in year t as a proportion of the total population in t. This variable reflects contemporaneous registration activity.
2. New consent rate[b]: $Consent_{rt}^{(flow_2)}$ measures newly registered consents in region r in year t as a proportion of the population that had not registered consent until t. This variable accounts for already high levels of prior consent registration.
3. Consent share: $Consent_{rt}^{(flow_3)}$ denotes the share of newly registered consents among all newly recorded decisions in region r and year t, with recorded decisions defined as the sum of newly registered consents and objections. This measures the balance of consents and objections among those who made an active choice.
4. Overall consent rate: $Consent_{rt}^{(stock_1)}$ is the accumulated number of individuals in region r who, by year t, had officially registered their consent, relative to the total population in t. This outcome approximates the prevalence of registered consents in the population, under the assumption that individuals remain in the registry once they have recorded their decision.
5. Lower bound consent rate: $Consent_{rt}^{(stock_2)}$ is defined as the accumulated number of registered consents in region r up to year t, net of all recorded objections, relative to the total population in that year. This indicator provides a more conservative measure of registered consent, as it assumes that each recorded objection represents the withdrawal of a previous consent.

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[15] Registry coverage is not measured as the share of municipalities in a region that are connected to it, as municipalities vary greatly in size.

As a second step, we use the stock of consent registrations to explain organ donation rates. We estimate the following specification using TWFE, with standard errors clustered at the regional level:

$$ODR_{rt} = \phi Consent^{(*)}_{rt} + \varphi' W_{rt} + Region_r + Year_t + \varepsilon_{rt}\,, \tag{2}$$

where ODR_{rt} denotes the organ donation rate in region r and year t. $Consent^{(*)}_{rt}$ is the cumulative consent rate. We run separate regressions for the two stock consent measures. The coefficient ϕ is our difference-in-differences estimate of interest. The vector W_{rt} is again a set of control variables (see lower panel of Table 1).

4 Results

We first examine the effects of expanding registry coverage on annual consent registrations, focusing on flow outcomes (new consents relative to the total population, the unregistered population, and the number of decisions). Table 2 reports TWFE estimates for registry expansion on new consent registrations. Across specifications, we find a consistently positive and predominantly statistically significant effect of local registry coverage.

The coefficients in columns (1)–(2) imply that a 1-percentage-point increase in registry coverage rate is associated with an increase in the new consent rate of 0.008-0.011 percentage points. Scaled to a 10-percentage-point increase, this corresponds to 0.08-0.11 percentage points, or an increase of about 4.6% to 6.4% relative to the mean annual consent registration rate of 1.7 new consents per 100 inhabitants.

Columns (3)–(4) report results using the alternative definition of the new consent rate, where the outcome is scaled by the population not registered. The coefficients on registry coverage remain positive and similar in magnitude in both specifications. While the estimate in column (3) is not statistically significant, the effect becomes statistically significant at the 5% level once control variables are included (column (4)). Our estimates imply that a 10-percentage-point increase in registry coverage raises the new consent rate by approximately 0.12 percentage points, corresponding to a 5.9% increase relative to the mean of two new consents per 100 individuals who are not already registered. Overall, we find very little difference in the estimates when scaling the outcome by the total population or the population unregistered.

When using the share of consents among all newly recorded decisions as a complementary outcome (columns (5)–(6)), the coefficients are also positive and statistically significant. A 10-percentage-point increase in registry coverage is associated with a rise of around 1.2 to 1.4 percentage points in the share of new consents among newly recorded decisions, corresponding to a relative increase of 1.6% to 1.8% compared to the mean consent share of 76.9 consents per 100 decisions.

Adding covariates (columns (2), (4), and (6)) slightly increases the magnitude of the estimates. All specifications include region and year fixed effects to account for time-invariant variation across regions and temporal shocks. The within R^2 increases once controls are added, indicating additional explanatory power beyond fixed effects.

Table 2: Registry coverage and consent registration rates

	Consent registration					
	New consent rate^{a}		New consent rate^{b}		Consent share	
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage^{reg}	0.008^{**}	0.011^{***}	0.008	0.012^{**}	0.124^{*}	0.138^{**}
	(0.004)	(0.003)	(0.005)	(0.005)	(0.071)	(0.066)
	[0.064]	[0.017]	[0.170]	[.050]	[0.075]	[0.052]
Mean dependent variable	1.731	1.731	2.020	2.020	76.877	76.877
Observations	273	273	273	273	267	267
Controls		✓		✓		✓
Region fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Within R^2	0.026	0.272	0.013	0.314	0.034	0.116

Notes: The table presents regression results using consent registration rates as the dependent variable. Columns (1)–(2) refer to new consent rate^{a}, with total population as denominator. Columns (3)–(4) refer to new consent rate^{b}, with population not already registered as denominator. Columns (5)–(6) refer to consent share, with decisions as denominator. Robust standard errors clustered at the regional level are reported in parentheses, and wild cluster bootstrap p-values in square brackets. Significance levels (based on clustered standard errors): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Building on the results from the first step, we next examine whether higher consent registrations translate into higher organ donation rates. As it is ultimately the cumulative share of the population having registered consent that determines the donor pool, we focus on stock outcomes (the overall consent rate and its lower-bound measure). Table 3 reports TWFE estimates of the effect of consent registrations on organ donation rates.

Table 3: Consent registration and organ donation rates

	Organ donation			
	Overall consent		Lower bound	
	(1)	(2)	(3)	(4)
Consent registration	0.600^{**}	0.855^{**}	0.537^{**}	0.714^{**}
	(0.260)	(0.362)	(0.232)	(0.300)
	[0.046]	[0.063]	[0.024]	[0.035]
Mean dependent variable	21.713	21.713	21.713	21.713
Observations	270	270	270	270
Controls		✓		✓
Region fixed effects	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Within R^2	0.034	0.089	0.030	0.077

Notes: The table shows the results of the regressions using organ donation rates as the dependent variable. Robust standard errors clustered at the regional level are reported in parentheses, and wild cluster bootstrap p-values in square brackets. Significance levels (based on clustered standard errors): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Using the overall consent rate as the regressor in our main specification (columns (1)–(2)), we find positive and statistically significant effects at the 5% level. A 1-percentage-point increase in the overall consent rate is associated with an increase in the organ donation rate of approximately 0.6 donors per million population, rising to about 0.86 donors per million population when including control variables. This corresponds to an increase in the average organ donation rate of 21.7 donors per million population by about 2.8% to 3.9%.

Columns (3)–(4) present results using the lower-bound measure of consent registrations, which adjusts for potential revocations of prior consents. Specifically, this measure subtracts all recorded objections from the number of consents in each year, capturing at least those consents that can reasonably be assumed to remain valid. While the estimated effects are somewhat smaller in magnitude due to the more conservative outcome definition, they remain positive and statistically significant, supporting the robustness of our findings.

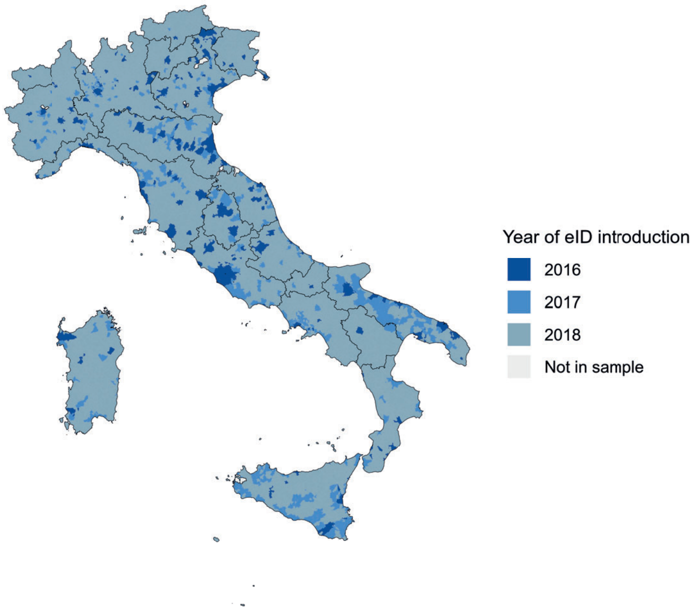
Again, all specifications include region and year fixed effects and clustered standard errors at the regional level. Taken together, the results are robust across several outcome measures, alleviating concerns that findings are driven by mechanical accumulation.

5 Complementary evidence

5.1 Regional-level effects

The staggered roll-out of municipal donor registries coincided with another major administrative reform. The gradual replacement of the traditional paper-based identity card by the electronic identity card (eID) (Ministero dell'Interno, 2025a) not only modernized identification processes but also had implications for recording donation preferences. The new eID allows access to online services provided by public administrations and can be requested at the municipal office of residence.[16] Notably, the distinctive aspect is that Italian citizens can apply for an initial eID anytime, even before their old paper-based ID expires. The roll-out of the current version of the eID began in 2016 with 199 municipalities, followed by an additional 350 in 2017 (see Figure 4), collectively covering about 50% of the Italian population (Ministero dell'Interno, 2025b). By 2018, the system had been extended nationwide, covering all 7,896 Italian municipalities.

Figure 4: Adoption of eID in Italian municipalities



Notes: The map shows the timing of the eID adoption in Italian municipalities between 2016 and 2018. Municipalities shown in light gray are excluded from the sample due to territorial changes within the observation period.

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[16] While other government-issued documents, such as passports or driving licenses, are valid for identification purposes, identity cards are the most widespread. The fee for obtaining the eID is €16.79, in part plus an additional municipal fee of approximately €5.

The introduction of the new eID followed a centrally coordinated schedule determined by national authorities. The order in which municipalities implemented the eID depends primarily on population size, tending to prioritize larger municipalities in the earlier phases of the roll-out. This may lead to observable differences between early and late adopters. To mitigate this concern, we include relevant covariates capturing demographic, socioeconomic, and infrastructural conditions in our analysis.

As the introduction of the new eID potentially increases the number of individuals confronted with the decision to register as an organ donor, we account for the overlapping roll-out of the registry and the eID. To do so, we link our dataset with information on the timing of local eID roll-out. Specifically, we define the measure of overlap as the share of a region's population residing in municipalities that provide access to both, and allows us to assess whether the combined implementation amplified the effect of the registry. We extend Equation (1) as follows:

$$Consent_{rt}^{(*)} = \delta_1 Coverage_{rt}^{reg} + \delta_2 Coverage_{rt}^{reg\times eID} + \theta' X_{rt} + Region_r + Year_t + \varepsilon_{rt}\,, \quad (3)$$

where $Coverage_{rt}^{reg\times eID}$ denotes the share of a region's population with access to eID, conditional on registry availability.[17]

Table 4 shows the results, when accounting for the joint roll-out of the eID. In columns (1)–(4), the coefficient related to the eID is positive and statistically significant at the 1% level, suggesting that consent registrations increase more strongly where registry and eID provision overlap. The effect of registry coverage remains positive and mostly statistically significant. When using the share of consents among all recorded decisions as a complementary outcome (columns (5)–(6)), the coefficient for registry coverage remains positive, while the interaction with the eID becomes negative and insignificant. We attribute this pattern to a compositional effect, as at early stages of registry adoption, only a few individuals registered a decision, likely those already inclined to consent, resulting in very high consent shares. As registry expansion reaches a broader population over time, consent shares tend to decline, even though the overall number of registered consents continues to increase. The within R^2 increases once controls are added and eID availability is accounted for, indicating additional explanatory power beyond fixed effects.

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[17] The interaction term $reg \times eID$ captures the joint availability of both infrastructures in a municipality.

Table 4: Registry coverage, eID availability and consent registration rates

	Consent registration					
	New consent rate[a]		New consent rate[b]		Consent share	
	(1)	(2)	(3)	(4)	(5)	(6)
Coverage^{reg}	0.007*	0.010**	0.007	0.011*	0.124	0.140*
	(0.004)	(0.004)	(0.006)	(0.005)	(0.074)	(0.069)
	[0.147]	[0.049]	[0.306]	[0.105]	[0.101]	[0.064]
Coverage$^{reg \times eID}$	0.029***	0.021***	0.036***	0.023***	−0.089	−0.098
	(0.007)	(0.006)	(0.010)	(0.007)	(0.088)	(0.076)
	[0.002]	[0.006]	[0.001]	[0.005]	[0.343]	[0.230]
Mean dependent variable	1.731	1.731	2.020	2.020	76.877	76.877
Observations	273	273	273	273	267	267
Controls		✓		✓		✓
Region fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Within R^2	0.147	0.330	0.116	0.354	0.040	0.123

Notes: The table presents regression results using consent registration rates as the dependent variable. Columns (1)–(2) refer to new consent rate[a], with total population as denominator. Columns (3)–(4) refer to new consent rate[b], with population not already registered as denominator. Columns (5)–(6) refer to consent share, with decisions as denominator. Robust standard errors clustered at the regional level are reported in parentheses, and wild cluster bootstrap p-values in square brackets. Significance levels (based on clustered standard errors): * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.2 Municipality-level effects

We further explore the effects of the eID at the municipal level, taking advantage of the higher granularity of municipality-level data. We now use the introduction of the eID as a binary treatment, which serves as a proxy for increased exposure to the organ donation decision. However, the fact that it became possible to obtain this new ID even before the expiration of one's current document may raise potential concerns about selection into treatment. Nevertheless, we consider it plausible that individuals applied for the eID primarily due to its technological features rather than the organ donation prompt. Certain groups were also explicitly incentivized to switch to the new ID.[18] To address potential selection bias, we control for observable covariates.

We restrict the sample to municipalities implementing the organ donor registry before the eID roll-out. Municipalities without a registry at that point do not provide any observable registration data and are therefore excluded. This restriction yields a reduced dataset comprising 4,905 out of 7,896 Italian municipalities (see Figure A.1 in the Appendix). Table 5 shows that the 2016 (2017/2018) group contains 2.5% (6.8%/90.7%) of municipalities, but 27.7% (28.2%/44.2%) of the total population.

Table 5: eID expansion

Year	Number of municipalities	Share of municipalities	Share of population
2016	123	0.025	0.277
2017	334	0.068	0.282
2018	4,448	0.907	0.442
Non-expansion	–	–	–

Notes: The table shows information on municipalities that adopted eID in 2016, 2017 or 2018 and previously had a registry.

Registration is measured in municipalities of very different sizes. Rome, for example, represented 0.81% (1 out of 123) of the municipalities that introduced the eID in 2016, but 18.48% of the population. Its contribution to the average outcome for the 2016 adopters group is very different with and without weights.

These data allow us to analyze changes in the share of registered consents with a before-after design, comparing municipalities that introduced the eID earlier (treatment group) to those that introduced the eID later (control group). Our main identification assumption is that, in the absence of the eID introduction, municipalities that were enabled to provide the eID would have followed parallel trends to those that had not yet implemented the new digital identity card. While this counterfactual scenario cannot be directly tested, municipalities should exhibit parallel trends in the pre-treatment period to support the credibility of the identification strategy.

Figure 5 plots average consent registration rates by the year of eID introduction. Panel (a)

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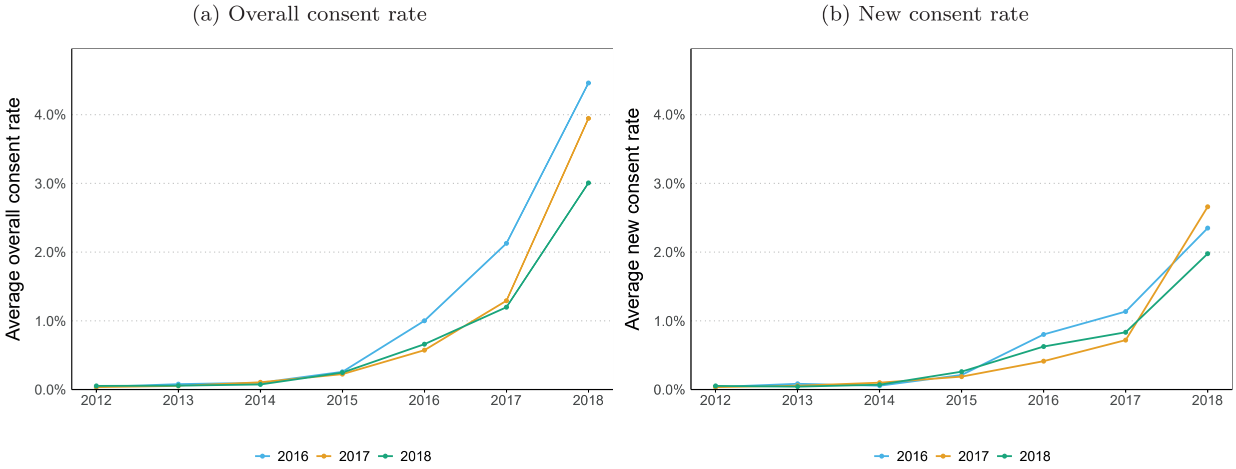
[18] For example, 18-year-olds could receive a €500 culture bonus when applying with the new eID, and teachers were offered a voucher of the same amount for professional training and educational resources (Dipartimento per l'informazione e l'editoria, 2017; Agenzia per l'Italia digitale (AGID), 2016).

displays the share of the population that has ever registered as organ donors, while panel (b) shows the population share of newly registered consents. In both panels, all groups exhibit low and stable registration rates prior to implementation, followed by a marked increase in the year of eID introduction, suggesting a strong association between the eID roll-out and registration behavior. The observed similarity in pre-trends further supports that the assumption of parallel trends may be reasonable.

Figure 5: Municipality consent registration trends


(a) Overall consent rate

(b) New consent rate

Notes: The figure shows average consent registration rates across municipalities by eID introduction year from 2012 to 2018.

Building on this descriptive evidence, we estimate the following difference-in-differences specification:

$$Consent_{mt} = \vartheta eID_{mt} + \mu' Z_{mt} + Municipality_m + Year_t + \varepsilon_{mt} \,, \qquad (4)$$

where, analogously to the specification described above, $Consent_{mt}$ denotes the cumulative number of individuals in municipality m who, by year t had officially registered their consent relative to the total population. eID_{mt} is a dummy variable that equals one once the eID has been implemented and zero otherwise. The coefficient ϑ captures the difference-in-differences estimate of interest. The vector Z_{mt} contains a set of control variables, and ε_{mt} represents the error term. We include municipality fixed effects $Municipality_m$ and year fixed effects $Year_t$. We consider the overall consent rate as the key indicator for organ donation. However, as it increases mechanically over time, we also run separate regressions using the annual rate of newly registered consents as an alternative outcome variable to account for annual changes in donor registration activity.

In our setting, all municipalities are eventually treated. Following Baker et al. (2025), we exclude data from the period in which the last cohort is treated, so that this last-treated group can serve as the never-treated that is assumed to exist in a staggered difference-in-differences setup. We also drop municipalities that received treatment in the first observed period, as they lack pre-treatment observations and, therefore, cannot contribute to identifying treatment effects.[19] This data restriction does not affect the validity of the analysis, as treatment effects cannot be identified in periods when all units are already treated. For the sake of comparability, we report population-weighted results.

To evaluate dynamic treatment effects over time and to assess possible pre-trends, we additionally estimate an event study specification. We use the estimator proposed by Callaway and Sant'Anna (2021) and estimate specifications both with and without covariates. Figure 6 displays aggregated event study estimates, including 95% simultaneous confidence intervals. Overall, our results suggest that asking more individuals about organ donation during the ID renewal process as part of the eID roll-out is associated with an increase in organ donor registration rates in municipalities that eventually implement the eID. For panel (a), we find no statistically significant differences in registration rates between municipalities in the years leading up to the eID roll-out, while differences emerge only after implementation. For panel (b), the event study estimates indicate slightly negative coefficients in the two years preceding the introduction of the eID, suggesting a modest decline in new registrations shortly before implementation. Some individuals may have postponed renewing their identity card once they knew that the eID would soon become available in their municipality.[20] After the introduction, the estimates turn positive, consistent with a steady increase in registrations following the roll-out of the eID. The results hold when accounting for control variables (see Figure C.2 in the Appendix). We report unweighted estimates as our main specification, capturing the effect for the average municipality. Population-weighted estimates based on pre-treatment population yield similar patterns, though they give more weight to larger and earlier-treated municipalities (see Figure C.3 in the Appendix).

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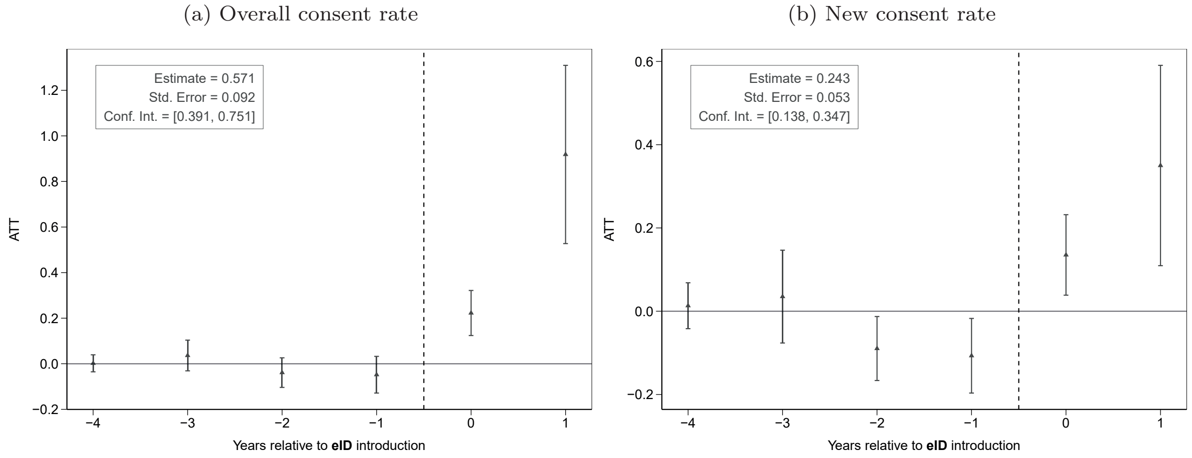
[19] This applies to municipalities that introduced the eID in the same year as the registry was established. For example, if a municipality received the registry and the eID in 2016, we cannot observe any registrations in 2015, prior to the introduction of the eID.

[20] In Italy, possession of an identity card is not mandatory, and a valid passport serves as an alternative identity document. Citizens may therefore delay renewal of their identity card without legal consequences.

Figure 6: Event study without covariates

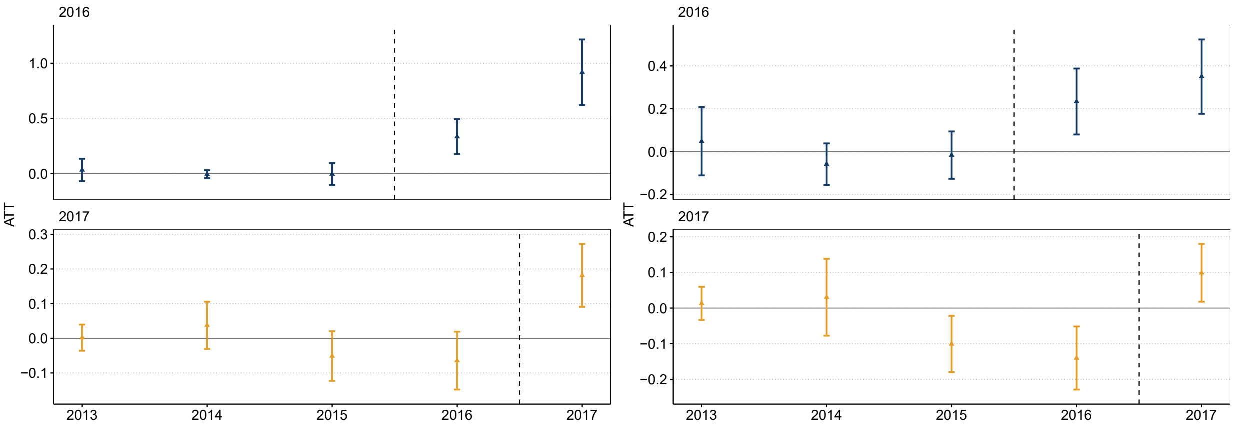

(a) Overall consent rate

(b) New consent rate

Notes: The figure displays event study estimates with staggered treatment timing, using the doubly robust estimation method proposed by Callaway and Sant'Anna (2021). Not-yet-treated municipalities serve as the comparison group. The outcome variables are the overall consent registration rate (panel (a)) and the population rate of newly registered consents (panel (b)), respectively. Point estimates are indicated by triangles, and 95% simultaneous confidence intervals are shown with vertical lines.

To explore potential heterogeneity across cohorts, we estimate group-time average treatment effects (ATTs) under the assumption that municipalities not yet treated can serve as a valid control group. Figure 7 reports separate event study estimates for each eID expansion cohort. For the 2016 and 2017 expansion groups, we find significant changes in consent registration rates after the eID implementation. Pre-treatment estimates remain close to zero for the overall consent rate, providing no evidence of differential pre-trends. The slight pre-trend observed for the new consent rate is mainly driven by the 2017 cohort, reflecting municipalities that received a registry only shortly before the eID introduction. We again find similar results when adding the same set of control variables (see Figure C.4 in the Appendix).

Figure 7: ATT for each expansion cohort



(a) Overall consent rate

(b) New consent rate

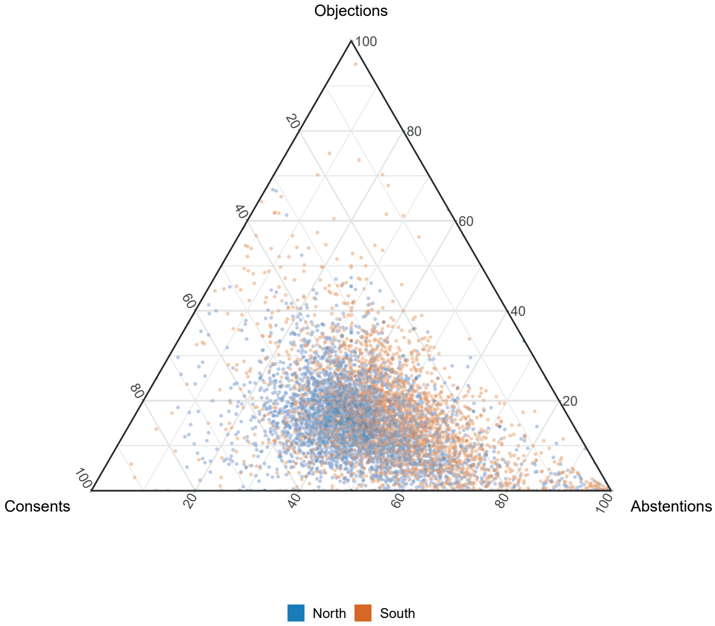
Notes: The figure displays group-time ATT estimates for two cohorts of municipalities that introduced the eID prior to 2018, using not-yet-treated municipalities as the comparison group. Uniform 95% confidence intervals are shown. The outcome variables are the overall consent rate (panel (a)) and the proportion of the population newly registering consent (panel (b)), respectively. Standard errors are clustered at the municipality level. The vertical dashed line indicates the time period immediately preceding eID introduction for each group.

6 Discussion

While our panel data cover only consents and objections, one might argue that a substantially larger number of individuals were approached, but ultimately chose not to register a decision, and that our analyses capture only part of the decision-making process. While panel data on abstentions at the municipal level are not available, we draw on a 2022 snapshot to address this concern.

As shown in Figure 8, the distribution of consents, objections, and abstentions varies across municipalities, but a distinct overall pattern emerges. In most municipalities, the majority of individuals either abstained from making a decision or consented to organ donation, while outright objections were comparatively rare. This pattern suggests that consents and objections records observed in our panel data are unlikely to be systematically biased by the presence of abstentions. Moreover, in line with regional heterogeneity patterns shown by Centro Nazionale Trapianti (2020), there appears to be a tendency for municipalities in the South to exhibit slightly higher abstention rates compared to those in the North.

Figure 8: Decision outcomes per municipality



Notes: The figure shows, for all municipalities in Italy, the shares of consents, objections, and abstentions among those approached in 2022.

Another concern that individuals might avoid registering a refusal and abstain instead due to social desirability can be mitigated by the two-step nature of the registration process in Italy. First, individuals are asked whether they wish to register a decision at all. Only those who agree to do so are subsequently asked to choose between consent and objection, while those who decline in the first step are classified as abstentions.

One limitation of our data is that we cannot rule out whether individuals who were previously asked about organ donation during an ID renewal are confronted with the question again during subsequent renewals, irrespective of whether they had already made a decision. Nonetheless, we consider this a minor concern, as only the earliest adopters are observed long enough for repeated questioning to become relevant, while our event study results indicate that effects materialize even before such potential re-exposure could occur.

Approximately 24 million people (about 40% of the population) in Italy have registered their organ donation decision since the municipal registries were rolled out. This is about fifteen times more than the registrations obtained through ASL and AIDO, which to date amount to less than 3% of the Italian population and rely on sign-ups without routinely asking citizens about their donation preferences. This highlights the importance of the prompting mechanism in increasing public engagement with organ donation decisions.

The observed downward trend in consents among decisions over time, albeit not significant, is also in line with experiences from Germany, where the recently introduced organ donor registry saw a sharp but short-lived increase in registrations shortly after its launch in March 2024 (Bundesinstitut für Arzneimittel und Medizinprodukte, 2025).[21] This suggests that early registrants are typically those already motivated to donate, while subsequent acceptance among the broader population progresses more slowly.

Our results indicate that prompting more people to make an organ donation decision by expanding registry coverage leads to more consent registrations, and that higher consent registrations, in turn, are associated with higher organ donation rates. Though our estimated effects may appear small, this should be interpreted with caution, as consent is necessary but not sufficient for realized donation. Translating consent registrations into realized donations is inherently limited, as a donation requires specific circumstances of death and the absence of medical contraindications.

In addition, it may be plausible that we understate the effect, given that our observation period is short in the context of organ donation, so our estimates capture only short-run responses. Registrations convert into donations only with a delay, as individuals are unlikely to become donors shortly after registration. As registered cohorts age, long-run effects may exceed our short-run estimates.

7 Conclusion

In this paper, we examine Italy's staggered introduction of prompted choice embedded in a gradual transition from an opt-in to an opt-out system. We study the effects on organ donation registrations and on actual deceased organ donation rates. Unlike the previous system, where individuals had to take the initiative to document their decision, they are now directly prompted to do so.

We show that by asking people about their organ donation preferences, documented consents substantially increase. In numbers, expanding the registry coverage by 10 percentage-points increases consent registrations of about 4.6% to 6.4%. Even if some individuals had already formed an opinion before being confronted with the organ donation question, the registry

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[21] In Germany, individuals are not explicitly asked whether they would like to register as organ donors.

made these choices visible, ensuring that transplant coordinators can quickly and reliably access the deceased's wishes once considered a potential donor. We also show that among individuals recording a decision, most opt for consent to organ donation.

By linking registry data to actual donation rates, we further find that higher accumulated consent shares are associated with higher donation rates. A 1-percentage-point increase in the stock of registered consent is associated with roughly 0.6-0.9 additional donors per million population, corresponding to an increase in organ donation rate by around 3%-4%. Thus, we provide new evidence that improving the accessibility of individuals' preferences is translatable into measurable increases in organ availability.

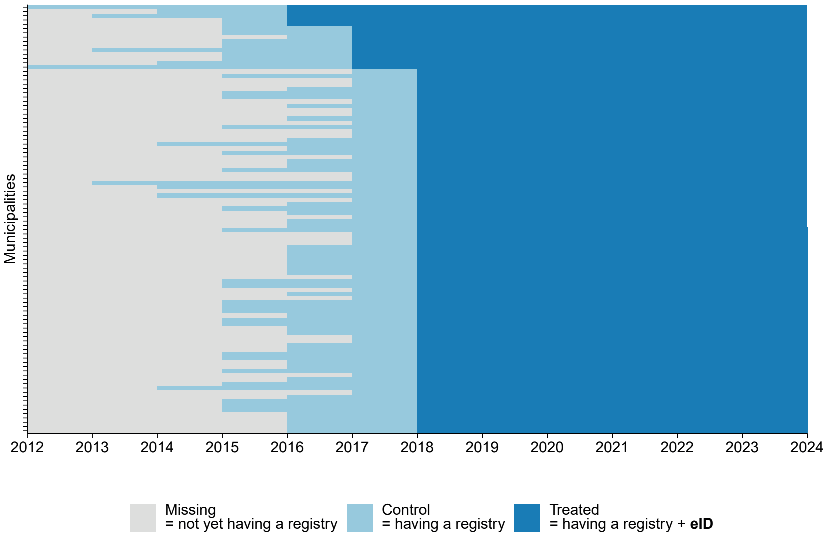
Our findings suggest that minor changes in administrative procedures, such as asking about willingness to donate organs when renewing an identity card, serve as a subtle nudge substantially increasing registration activity. In combination with centralized recording of individual decisions, this middle ground approach between opt-in and opt-out policies can enhance the effectiveness of organ donation systems. Given that many countries face a similar gap between widespread support for organ donation and low levels of documented consent, these findings have broader relevance beyond the Italian context.

Appendices

A Sample

Figure A.1 visualizes the panel structure after restricting the sample to municipalities that implemented the registry before adopting the eID. Gray areas indicate missing observations for municipalities whose registry had not yet been implemented, whereas light blue represents municipalities with an operational registry and continuously observable registration data from that point onward. This panel serves as the basis for the main analysis in Section 5.2.

Figure A.1: Unbalanced panel



Notes: The figure shows 100 randomly selected municipalities.

The sample comprises Italian municipalities as of 2025. A small number of municipalities had to be excluded from the analysis (see Table A.1). Specifically, two municipalities changed both their province and region during the observation period. In addition, eleven municipalities were subject to administrative reorganization through mergers or splits, preventing a consistent assignment of treatment status.

Table A.1: Excluded municipalities

Municipality	Reason of exclusion
Montecopiolo (Emilia-Romagna, Rimini)	Change of region and province
Sassofeltrio (Emilia-Romagna, Rimini)	Change of region and province
Setteville (Veneto, Belluno)	Merger of municipalities that adopted the eID at different points in time
Borgo Valbelluna (Veneto, Belluno)	Merger of municipalities that adopted the eID at different points in time
Borgo Veneto (Veneto, Padova)	Merger of municipalities that adopted the eID at different points in time
Santa Caterina d'Este (Veneto, Padova)	Merger of municipalities that adopted the eID at different points in time
Pesaro (Marche, Pesaro-Urbino)	Merger of municipalities that adopted the eID at different points in time
Trapani (Sicilia, Trapani)	Spin-off of a municipality subdivision
Misiliscemi (Sicilia, Trapani)	Formation out of a municipality subdivision
Caselle Torinese (Piemonte, Torino)	Spin-off of a municipality subdivision
Borgaro Torinese (Piemonte, Torino)	Spin-off of a municipality subdivision
Settimo Torinese (Piemonte, Torino)	Spin-off of a municipality subdivision
Mappano (Piemonte, Torino)	Formation out of municipality subdivisions

Notes: The table lists the municipalities that were excluded from the sample. Region and province are indicated in parentheses.

B Outcomes

New consent rate:

$$Consent_{rt}^{(flow_1)} = \frac{Consents_{rt}}{Population_{rt}} \tag{B.1}$$

$$Consent_{rt}^{(flow_2)} = \frac{Consents_{rt}}{Population_{rt} - \sum_{\tau \leq t}^{t} Consents_{r\tau}} \tag{B.2}$$

Consent share:

$$Consent_{rt}^{(flow_3)} = \frac{Consents_{rt}}{Consents_{rt} + Objections_{rt}} \tag{B.3}$$

Overall consent rate:

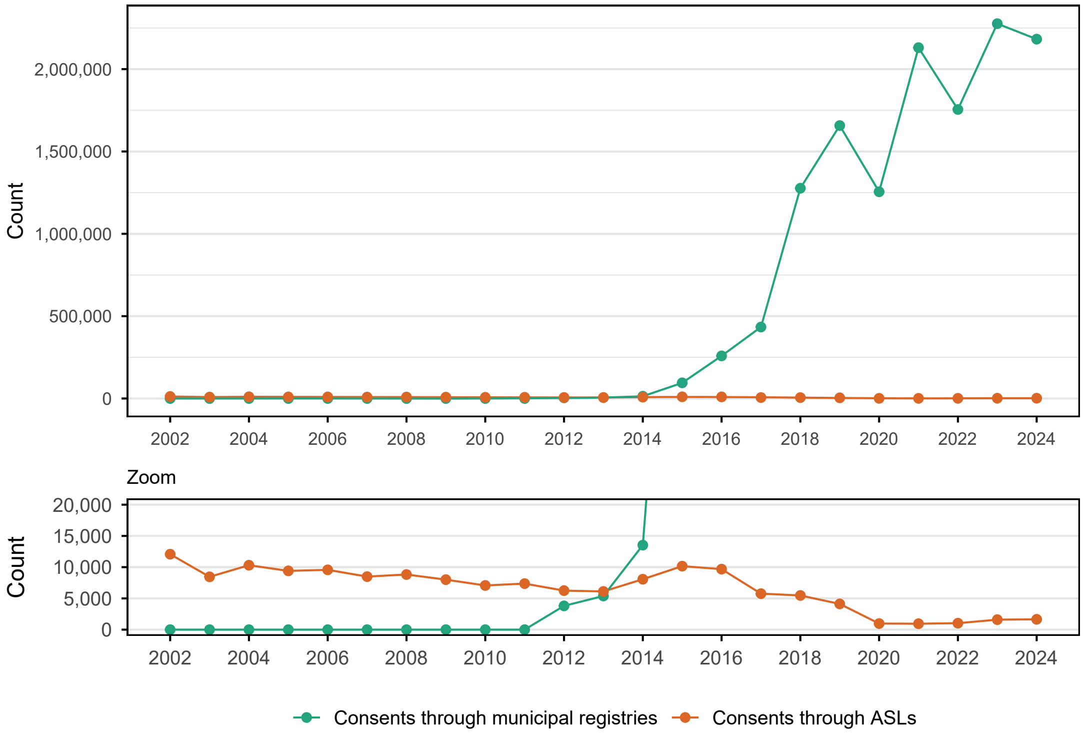
$$ConsentRate_{rt}^{(stock_1)} = \frac{\sum_{\tau \leq t}^{t} Consents_{r\tau}}{Population_{rt}} \tag{B.4}$$

Lower bound consent rate:

$$ConsentRate_{rt}^{(stock_2)} = \frac{\sum_{\tau \leq t}^{t} Consents_{r\tau} - Objections_{r\tau+1}}{Population_{rt}} \tag{B.5}$$

C Additional figures

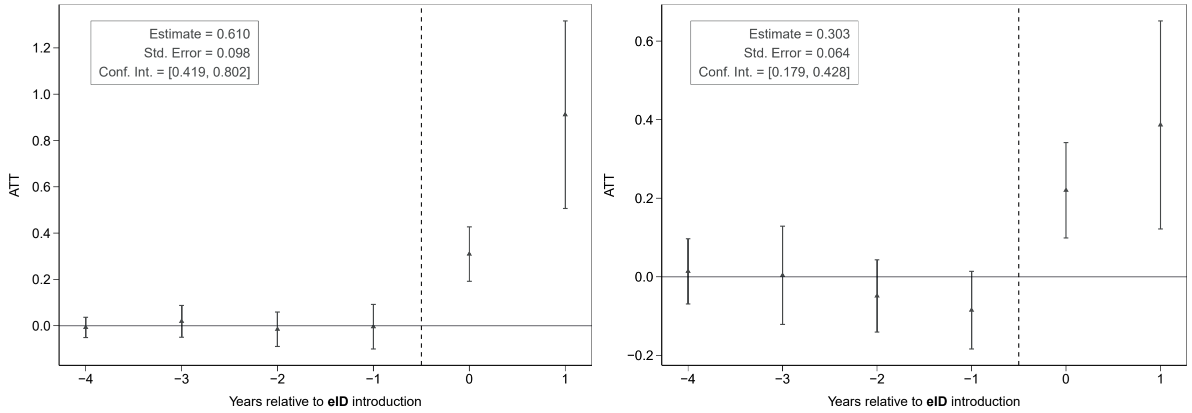
Figure C.1: Trends in consent registrations through municipal registries and ASLs



Notes: The figure shows consent registrations through ASLs and through municipal registries (prompted choice). Registrations through municipal registries were zero before 2012, as these registries became available only after that point. The lower panel zooms in to make the differences at lower levels more visible.

We attribute the temporary decline in registration numbers in 2020 to administrative factors rather than changes in individuals' willingness to register as organ donors. During the COVID-19 pandemic, the validity of ID cards was extended, leading to fewer renewals and, consequently, fewer citizens being asked about organ donation.

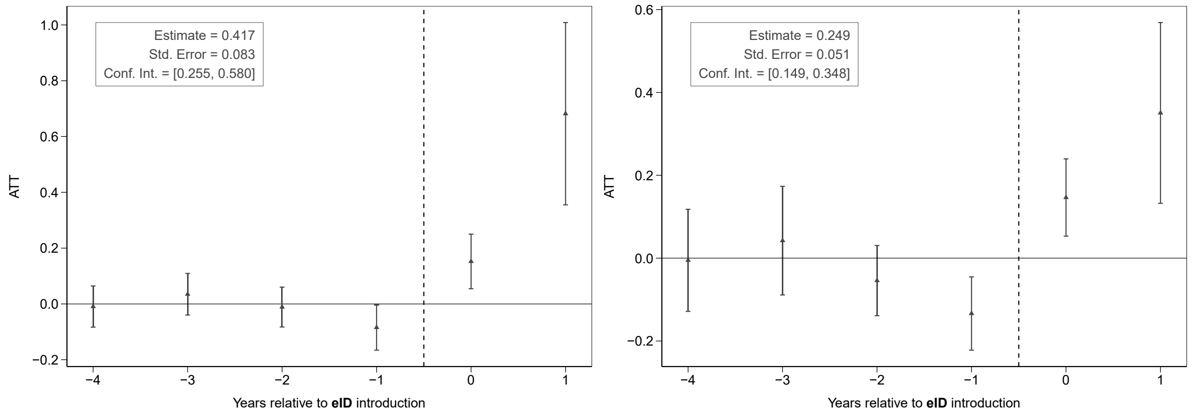
Figure C.2: Event study with covariates


(a) Overall consent rate

(b) New consent rate

Notes: The figure displays event study estimates with staggered treatment timing, using the doubly robust estimation method proposed by Callaway and Sant'Anna (2021). Not-yet-treated municipalities serve as the comparison group. The outcome variables are the overall consent registration rate (panel (a)) and the population rate of newly registered consents (panel (b)), respectively. Point estimates are indicated by triangles, and 95% simultaneous confidence intervals are shown with vertical lines. Control variables include the population shares of taxpayers, road traffic accidents, and religious marriages.

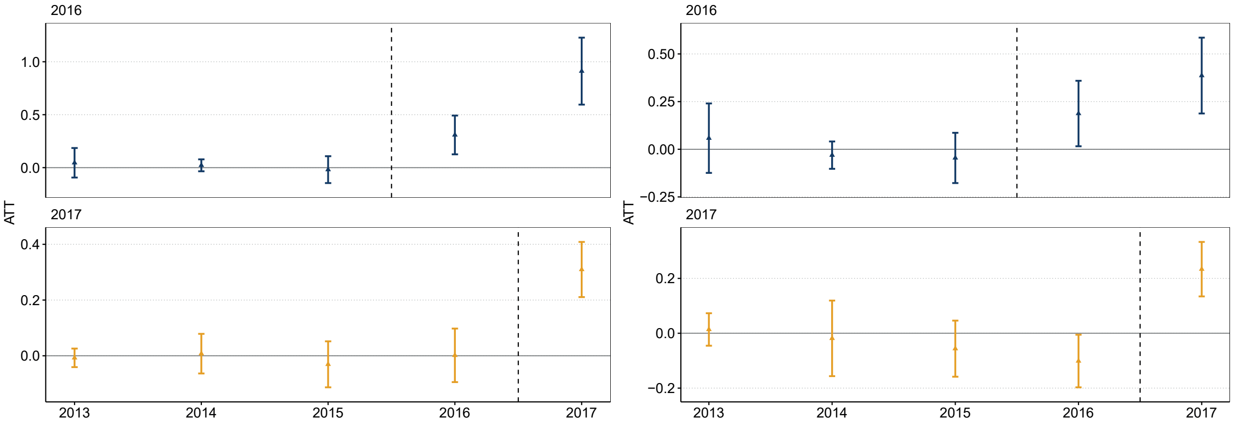
Figure C.3: Event study, population weighted


(a) Overall consent rate

(b) New consent rate

Notes: The figure displays event study estimates with staggered treatment timing, using the doubly robust estimation method proposed by Callaway and Sant'Anna (2021). Not-yet-treated municipalities serve as the comparison group. The outcome variables are the overall consent registration rate (panel (a)) and the population rate of newly registered consents (panel (b)), respectively. Point estimates are indicated by triangles, and 95% simultaneous confidence intervals are shown with vertical lines. All estimates are weighted by 2012 population, with weights capped at the 95th percentile of the distribution to avoid the undue impact of very large municipalities.

Figure C.4: ATT for each expansion cohort, including covariates



(a) Overall consent rate

(b) New consent rate

Notes: The figure displays group-time ATT estimates for two cohorts of municipalities that introduced the eID prior to 2018, using not-yet-treated municipalities as the comparison group. Uniform 95% confidence intervals are shown. The outcome variables are the overall consent rate (panel (a)) and the proportion of the population newly registering consent (panel (b)), respectively. Standard errors are clustered at the municipality level. The vertical dashed line indicates the time period immediately preceding eID introduction for each group. Control variables include the population shares of taxpayers, road traffic accidents, and religious marriages.

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Otto von Guericke University Magdeburg
Faculty of Economics and Management
P.O. Box 4120 | 39016 Magdeburg | Germany

Tel.: +49 (0) 3 91 / 67-1 85 84
Fax: +49 (0) 3 91 / 67-1 21 20

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